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(54) Exercise platform with moving conveyor

(57) The platform has a movable conveyor formed from individual (but interconnected) slats 3, the ends of the slats being secured to a pair of drive belts which run around timing pulleys 7 interconnected with a further pulley 8 which can be driven by a belt from a drive motor. The slats 3 are supported along the length of a fixed frame by a support structure comprising a belt running around main pulleys 10, intermediate support pulleys 11 and a series of support rollers 12 mounted on fixed support plates 13. This support structure provides a very good support for the conveyor without creating any significant frictional resistance to movement thereof.

The platform may be used as a training slope for skiing practice by making it longer and wider and by bonding low friction material to the surfaces of the slats 3. For beginners, ski poles may be fixed to both sides of the platform by swivel joints.

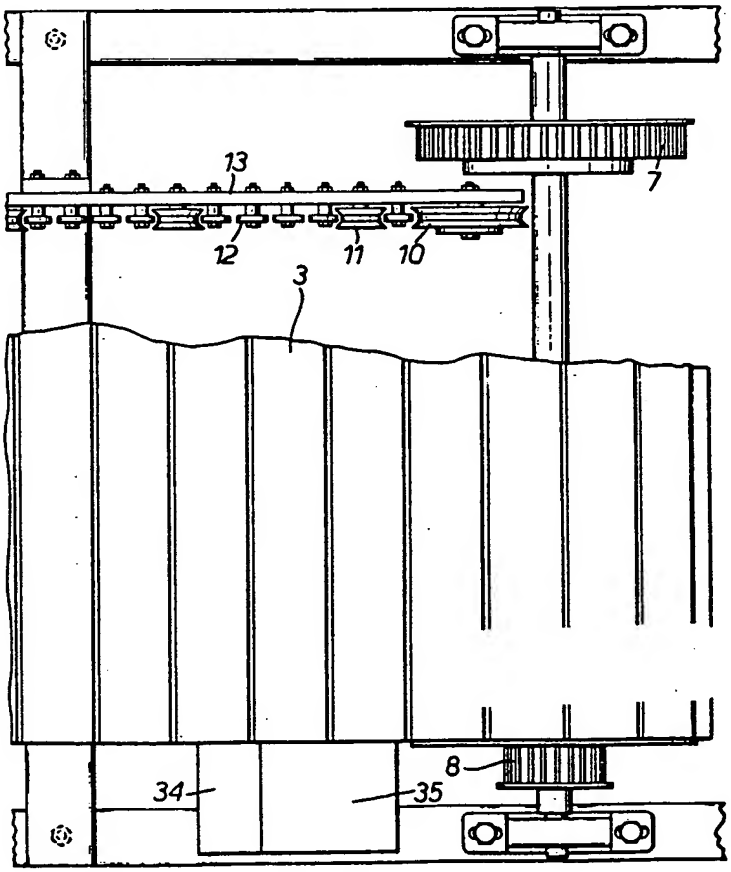

FIG.3.

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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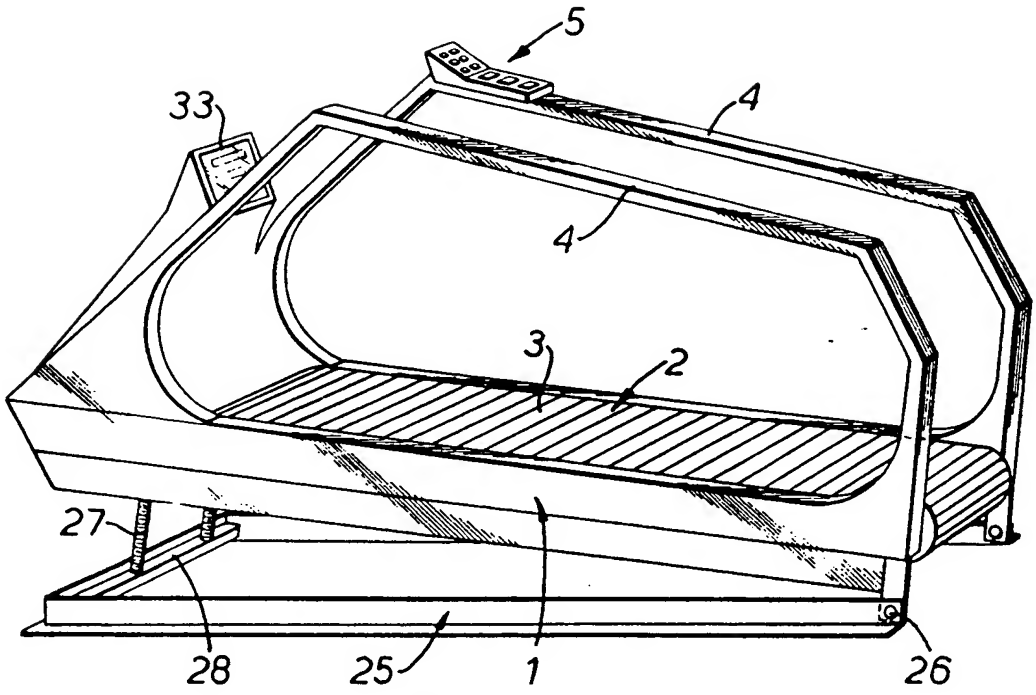

FIG. 1.

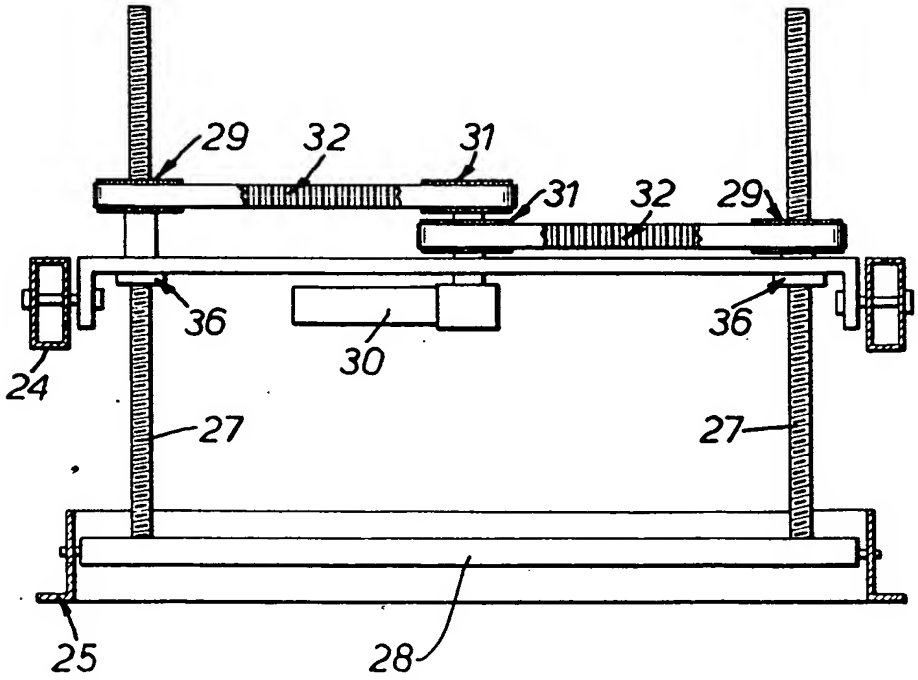

FIG. 8.

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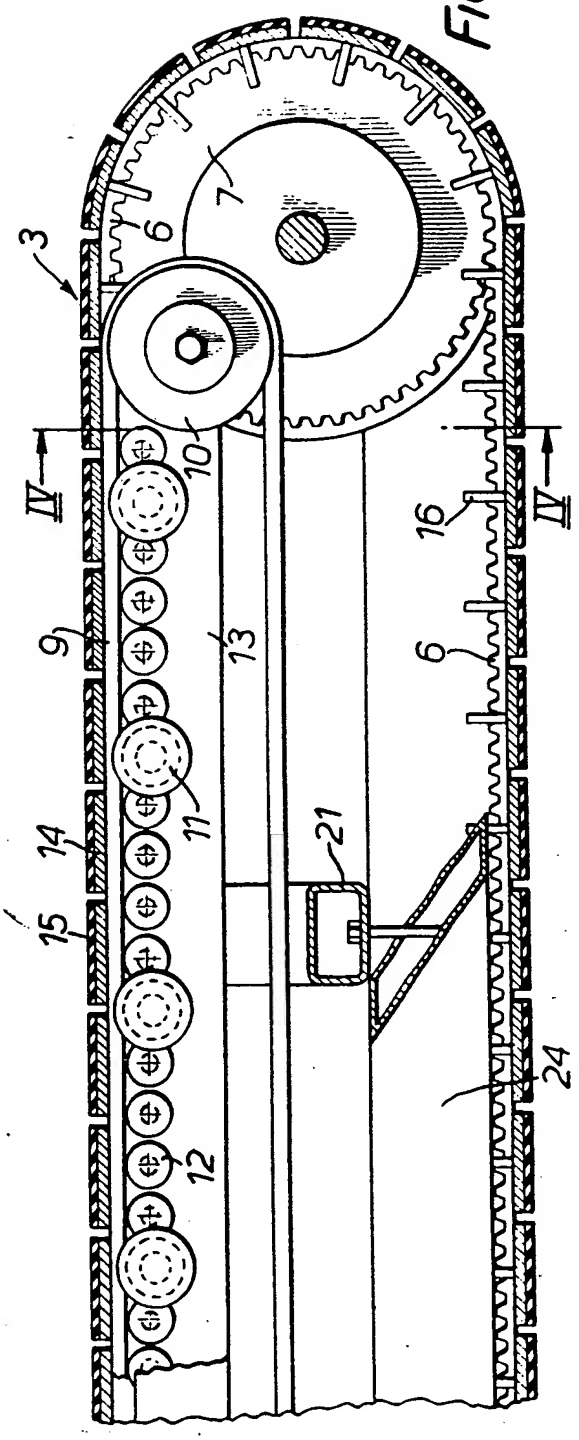
FIG. 2.



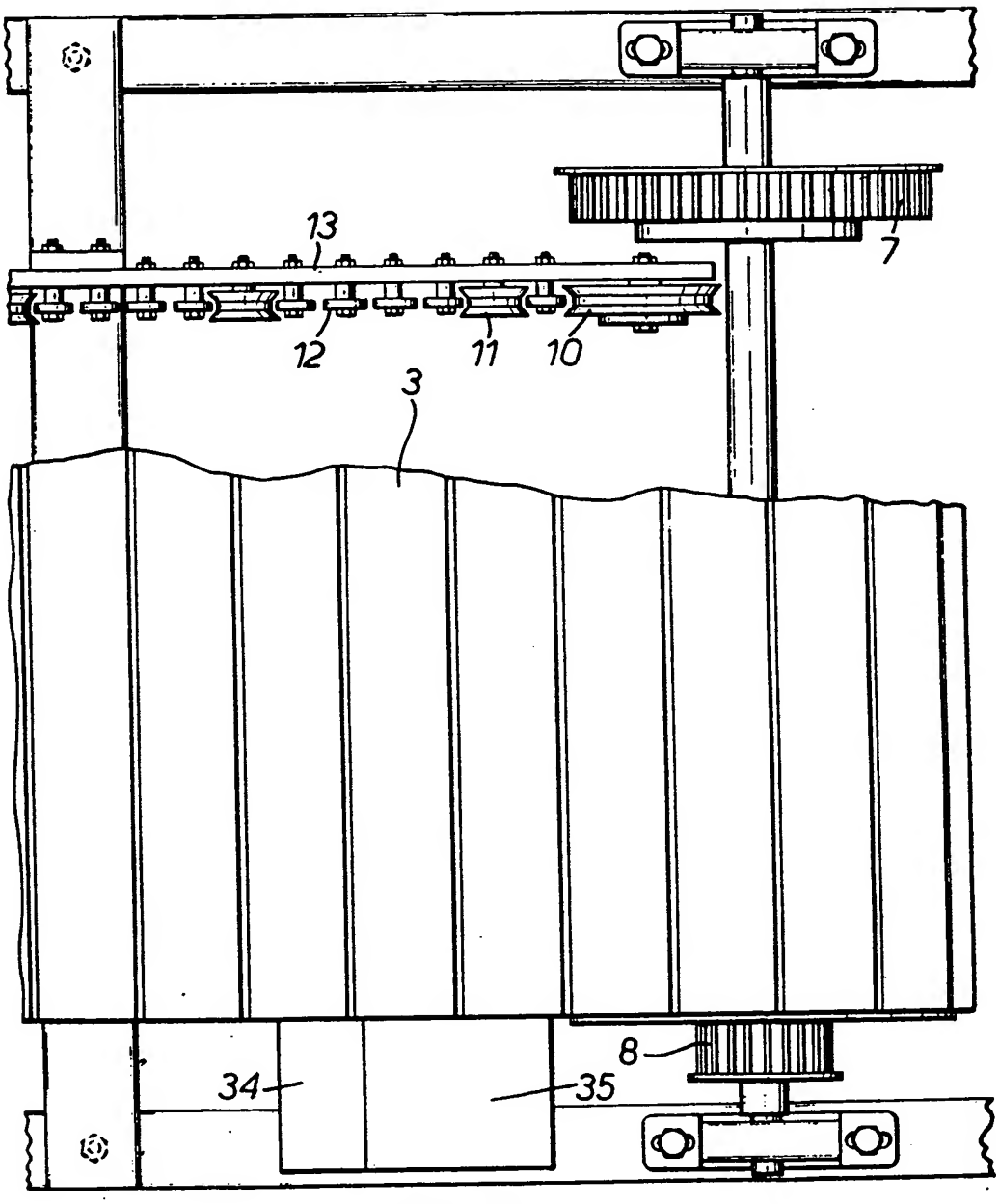


FIG. 3.

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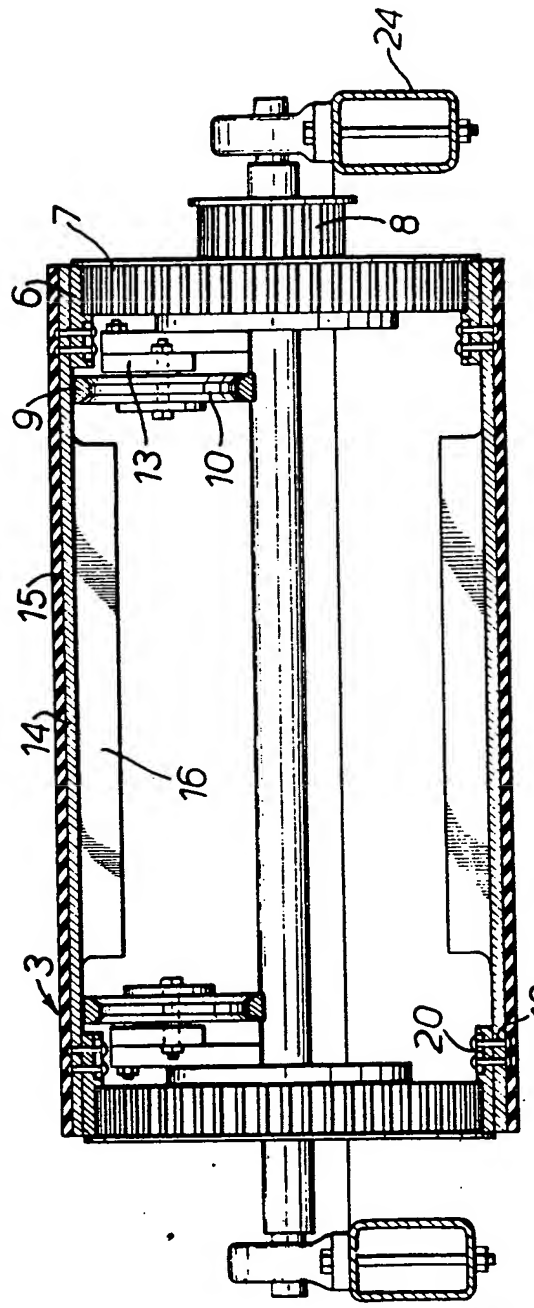

FIG.4.

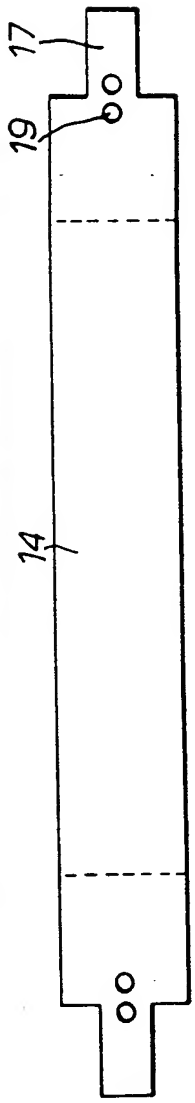

FIG.5.

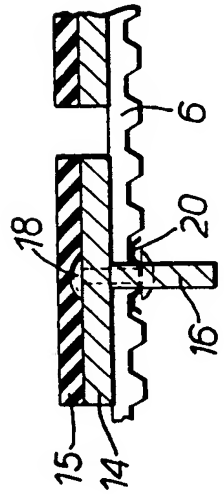

FIG.6.

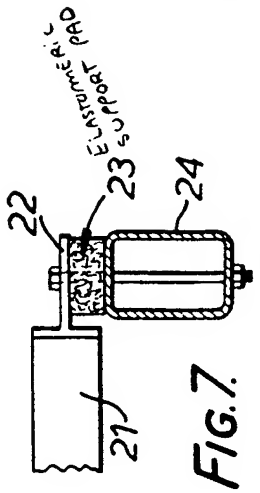

FIG.7.

SPECIFICATION

Improvements relating to exercising platforms

A number of exercise platforms are known (often called "jogging machines") which are in the form of an endless conveyor which is either free running so that it tends to move rearwardly as the user walks or runs in a forward direction, or which may be motorised so as to determine the speed at which the user has to run in order to remain in a static position relative to the support of the platform. The change in weight applied to the conveyor varies continuously as the user raises and lowers each foot and this will result in a variation in frictional force which can tend to cause fluctuation in the speed at which the conveyor moves. Furthermore without adequate support the conveyor may give substantially as each foot comes down and this can be uncomfortable.

It is an object of this invention to provide an exercise platform utilising a moving conveyor which has good support for the conveyor and which minimises frictional resistance.

According to the invention there is provided an exercise platform comprising a movable conveyor constructed from slats secured at or near their two ends to a respective one of a first pair of endless belts, chains or the like passing round timing pulleys, and a support structure comprising a sequence of support bearings over which run the outer end portions of the slats.

By this construction the slats are held securely by the first pair of endless belts or the like and are carried or driven around the device by the timing pulleys. However the slats are supported in the region between the timing pulleys by the separate support structure which can be made to have low frictional resistance and which can support the slats to a substantial extent.

In the preferred embodiment a second pair of endless belts will be carried by the support bearings and the outer end portions of the slats will rest on the belts. These belts then provide a means of transferring the load from the slats still more evenly to the support bearings and thus to the base of the platform. In this arrangement the support bearings will ideally include main pulleys at the ends of the support structure and intermediate pulleys between the two ends of the support structure as well as plain bearing rollers. The intermediate pulleys will then tend to prevent the belt from moving sideways off the rest of the support bearings.

It will be appreciated, however, that the support bearings could be in the form of rotatable pins or rollers set in respective support tracks, the slats running directly on these without the intermediate belt.

The slats may advantageously be secured to portions of the first pair of belts or the like extending inwardly of the timing pulleys. Preferably, in this arrangement, the slats will be secured to toothed belts by bolts, rivets or the like passing through each slat, the belt and a retaining clip shaped to fit over the teeth of the belt.

The slats will ideally be of T-section with the downward limb of the T inwardly directed and cut away at its ends so as not to interfere with the timing pulleys and support bearings. The slats will preferably be metal sections, giving the required strength, with a rubberised covering on their outer surfaces for the comfort of the user.

One or more of the timing pulleys may readily be provided with a motorised drive. In this case it is preferable to include means for controlling the speed of operation of the motorised drive.

The invention may be performed in various ways and a preferred further embodiment thereof will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a side view of an exercise platform of this invention;

Figure 2 is a vertical section through the drive mechanism for a moving conveyor of the exercise platform shown in Figure 1;

Figure 3 is a plan view of parts of the conveyor drive;

Figure 4 is a section on line IV—IV of Figure 2;

Figure 5 is a plan view of a tread section of one of the slats of the conveyor;

Figure 6 is an enlarged detail of the interconnection between a slat and a drive belt;

Figure 7 is an illustration of a modified track support for the exercise platform; and

Figure 8 is a diagrammatic illustration of means for raising one end of the track support.

Referring first to Figure 1 there is shown an exercise platform having a support base 1 within which is located a movable conveyor 2 formed from individual slats 3. Steadying handles 4 are provided at the sides of the platform 1 and one of these incorporates switch controls 5 which may be used to set a speed controller 34 which controls the speed of a motor 35 (Figure 3) driving the conveyor 2. As can be seen from Figures 2, 3 and 4 the individual slats 3 are secured to a pair of drive belts 6 which run round timing pulleys 7 at the ends of the conveyor 2. One of these pulleys 7 is integral with a pulley 8 which can be driven by a belt from the drive motor 35. The individual treads 3 are supported in the region between the timing pulleys 7 by a support structure comprising a vee belt 9 running round main pulleys 10 and intermediate support pulleys 11 and over a series of support rollers 12, all of which are mounted on support plates 13.

As can be seen from Figure 4 each slat 3 comprises a T-section tread member 14 provided with a rubberised covering 15. The end portions of the downward limb 16 of the T are cut away so as not to interfere with the timing pulleys 7 and the other pulleys 10 and 11. As shown in Figure 5 the end parts 17 of the treads 14 are partly cut away where they lie over the part of the belt 6 which will run around the timing pulleys 7. Rivets 18 (Figure 6) pass through holes 19 in the treads 14 and also through the belt 6 and a retaining clip 20 which is shaped to fit in the teeth of the belt 6.

In use the exercise platform can either be free running or driven by the motor interconnected with the pulley 8. As a user runs forwardly at a correct speed the conveyor 2 will move rearwardly at the

same speed so that the user remains in an essentially static position with respect to the fixed base 1 of the platform. The weight of the user applied to the conveyor 2 as each foot lands thereon is absorbed by one or more of the slats 3 and passes to the side plates 13 through the belt 9 and the pulleys 11 and roller bearings 12. The support provided in this way for the slats 3 substantially reduces unevenness in the running surface and does not significantly affect the smooth running of the timing pulleys 7 as these are essentially separate from the support structure for the slats. As the slats 3 move rearwardly they will tend to pull the belt 9 round with them and the bearings for the pulleys 10 and 11 and the rollers 12 provide little frictional resistance to this movement. The conveyor 2 therefore runs very smoothly and provides a comfortable running surface for the user without any significant undulations because each of the slats 3 is well supported at all times by the support structure.

As shown in Figure 7 the ends of track support members 21 (as shown, for example, in Figures 2 and 3) may be flattened at 22 (Figure 7), thus enabling elastomeric support pads 23 to be positioned between the track support members 21 and main frame members 24. This gives more resilience to the running track and would give the user the option of having a soft or a hard track by utilising either elastomeric pads 23 or solid metal spacers.

As shown in Figure 1 the conveyor 2 may be tilted, together with its support base 1, with respect to a base frame 25. The support base 1 is connected at the rear of the base frame 25 by means of a pivot 26 and a raising and lowering mechanism (as shown in Figure 8) operates on the front end of the support base 1. Thus a pair of threaded support rods 27 are attached to a swivel bar 28 which is pivotally located on the base frame 25. The forward end of the support base 1 is mounted by means of threaded drive nuts 36 onto the support rods 27. Drive pulleys 29 are driven by a motor 30 connected to further drive pulleys 31 acting on timing pulleys 32. The motor 30 can therefore be driven in the forwards or reverse direction to raise or lower the support base 1 as desired. Motorised driving of the drive pulleys 29 could be replaced by a simple manual operation if preferred.

Control of the elevation of the conveyor 2 and the speed of movement of the conveyor can be used, in conjunction with a microprocessor, to make up a desired programme equivalent, for example, to uphill or flat running at fast or slow speeds. Due to the free running nature of the track some means of braking of the conveyor 2 is necessary to maintain the desired speed. This can most readily be done by dynamic braking through the speed controller so that the motor not only drives the track but also brakes it. A display monitor 33 (Figure 1) connected to the microprocessor can indicate speed, time, distance, elevation and the programme selected.

If the conveyor 2 is made much wider and with a longer track the platform could be used as a continuous training slope for skiing practice using short training skis. For this purpose a low friction material will be bonded to the surfaces of the slats 3. This could, for example, comprise an array of bristles as conventionally used on an artificial ski slope. For beginners ski poles could be fixed to both sides of the platform by means of a swivel joint.

Further modifications to the overall design may be made as may occur to those skilled in the art. For example the T-section tread members 14 could be replaced by channel aluminium or angle iron members. Furthermore the tread members 14 could be interconnected in groups of 2 up to all those present by vulcanising a continuous covering 15 in the form of a belt onto the surface of the tread members. It should be noted also that whilst the timing pulley 7 shown at the one end of the conveyor 2 has drive teeth, the pulley at the other end need not have such teeth.

The pulleys 10 and 11 carrying the belt 9 could be replaced by further support rollers so that the tread members 14 just run over the support rollers 12. As an alternative there could be fixed hardened steel bars over which the ends of the tread members 14 will run, those ends being provided with a surface formed from a low friction material. This arrangement could be reversed with the tread members carrying hardened steel pads which run over fixed bars formed from or coated with a low friction material.

With wider tracks, such as that proposed for an artifical ski slope, additional support for the treads could be provided centrally of the track by cutting out a central portion of the leg 16 of the T of each T-section tread member 14.

It will be appreciated that the motor 35 and speed controller 34 may be positioned elsewhere than as illustrated in Figure 3, such as in the face space at the end of the assembly.

CLAIMS

1. An exercise platform comprising a movable conveyor constructed from a first pair of endless belts, chains or the like passing round timing pulleys, slats secured at or near their two ends between the first pair of belts or the like and a support structure comprising a sequence of support bearings over which run the outer end portions of the slats.

2. An exercise platform according to claim 1, wherein a second pair of endless belts, chains or the like are carried by the support bearings and the outer end portions of the slats rest on the second pair of belts or the like.

3. An exercise platform according to claim 2, wherein the support bearings include main pulleys at the ends of the support structure and intermediate pulleys between the two ends of the support structure as well as plain bearing rollers.

4. An exercise platform according to claim 2 or claim 3, wherein the support bearings are mounted on support plates at the sides of the platform.

5. An exercise platform according to claim 1, wherein the support bearings are rotatable pins or rollers set in respective support tracks.

6. An exercise platform according to any one of

claims 1 to 5, wherein the slats are secured to portions of the first pair of belts or the like so as to extend inwardly of the timing pulleys.

7. An exercise platform according to claim 6, wherein the slats are secured to toothed belts by bolts, rivets or the like passing through each slat, the belt and a retaining clip which is shaped to fit over the teeth of the belt.

8. An exercise platform according to any one of claims 1 to 7, wherein the slats are of T-section with the downward limb of the T inwardly directed and cut away at its ends so as not to interfere with the timing pulleys and support bearings.

9. An exercise platform according to any one of claims 1 to 7, wherein the slats are channel aluminium or angle iron members.

10. An exercise platform according to any one of claims 1 to 9, wherein the slats are metal sections with a rubberised covering on their outer surfaces.

11. An exercise platform according to claim 10, wherein the covering is applied in continuous strips to interconnect two or more slats or as a single strip interconnecting all the slats.

12. An exercise platform according to any one of claims 1 to 11, wherein a motorised drive is provided for one or more of the timing pulleys.

13. An exercise platform according to claim 12 including means for controlling the speed of operation of the motorised drive.

14. An exercise platform according to any one of claims 1 to 13, wherein the conveyor and support structure is carried by a support base which is pivotally mounted on a base frame so that the forward end of the support base may be raised or lowered as required, so as to incline the conveyor.

15. An exercise platform according to any one of claims 1 to 14, wherein the support structure is interconnected with main support frame members by means of elastomeric pads.

16. An exercise platform substantially as herein described with reference to the accompanying drawings.

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